

5090
Ser 6227/L9291-2
18 October 1999

From: Commanding Officer, Engineering Field Activity, West, Naval Facilities
Engineering Command

To: U.S. Environmental Protection Agency (Attn: Ms. Claire Trombadore)
California Department of Toxic Substances Control (Attn: Mr. Chein Kao w/ 2
copies of encl)
City & County of San Francisco, Bureau of Public Health (Attn: Ms. Amy
Brownell)

Subj: PARCEL B REMEDIAL ACTION, ENGINEERING FIELD ACTIVITY, WEST,
NAVAL FACILITIES ENGINEERING COMMAND, HUNTERS POINT
SHIPYARD, SAN FRANCISCO, CALIFORNIA

Encl: (1) Parcel B Excavation Summaries and Maps
(2) Preliminary PAH and PCB Statistical and Spatial Analysis, Parcel B

1. Enclosures (1) are (2) are submitted for your review and information. Summaries are being prepared for each of the 46 Parcel B excavations with contamination exceeding the individual contaminant of concern (COC) ROD cleanup levels. Each summary includes information on the remedial investigation, the remedial action, confirmation sampling, residual risk at the excavation, and conclusions. This submittal contains the first ten of these summaries for the following excavations.

Excavation	Screening Data Submittal Date
IR-07 7-3	August 23, 1999
IR-07 B0536	August 23, 1999
IR-07 B0628	August 23, 1999
IR-07 B1132	August 23, 1999
IR-18 18-2	August 23, 1999
IR-18 B0337	September 2, 1999
IR-18 B0638	October 28, 1999
IR-23 23-1	October 28, 1999
IR-23 23-2	September 2, 1999
IR-60 60-2	September 2, 1999

The Navy will submit additional excavation summaries November 1, 1999.

2. Enclosed also are the preliminary findings of the spatial and statistical analyses the Navy is conducting.
3. A meeting is scheduled for Thursday, October 28 at 10am at Tetra Tech EM, Inc. to discuss the enclosures if an effort to determine what, if any, additional action may be required. An agenda will be provided prior to the meeting.
4. If you have any questions regarding these enclosures, please contact Ms. Jil Finnegan, Code 6227, at (650) 244-2554.

MICHAEL E. MCCLELLAND
By direction

Copies to:

I.T. Corp (Attn: Mr. Don Marini w/o encls)
Tetra Tech EMI (Attn: Mr. Jason Brodersen w/o encls)
Tech Law Inc. (Attn: Mr. Adam Klein)
California Regional Water Quality Control Board (Attn: Mr. Chris Maxwell)
City and County of San Francisco, City Attorney's Office (Attn: Ms. Rona Sandler)
Sheppard, Mullin, Richter, and Hampton (Attn: Mr. Robert Hocker)
City and County of San Francisco, Mayor's Office of Economic Development (Attn: Mr. Jessie Blout)
ARC Ecology (Attn: Ms. Christine Shirley)

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Blind copies to:
622, 6221, 6227, 09CNB
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Admin Record (3 Copies w/encls)
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Chron File:
Activity File: HPS

**HUNTERS POINT SHIPYARD PARCEL B REMEDIAL ACTION
EXCAVATION SUMMARIES**

ACRONYMS AND ABBREVIATIONS

bgs	Below ground surface
CAP	Corrective Action Plan
ELCR	Estimated lifetime cancer risk
EPA	United States Environmental Protection Agency
HI	Hazard index
HPAL	Hunters Point Shipyard ambient level
HPS	Hunters Point Shipyard
IR	Installation restoration
IT	IT Corporation
LUFT	Leaking underground fuel tank manual
mg/kg	Milligrams per kilogram
NA	Not applicable
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
RME	Reasonable maximum exposure
ROD	Record of decision
RWQCB	Regional Water Quality Control Board
TPH-d	Total petroleum hydrocarbons as diesel
TPH-g	Total petroleum hydrocarbons as gasoline
TPH-mo	Total petroleum hydrocarbons as motor oil
µg/kg	Micrograms per kilogram

NOTE

In situ/screening: The chemical was detected during in situ characterization performed by IT for waste disposal or during IT's screening, at concentrations that exceeded the ROD cleanup goals.

IR-07: 7-3 (GRID CELLS 0823, 0824, 0825, 0923, 0924, 0925, 1023, 1024, 1025, 1123, 1124, 1125)

Operational History and Site Characterization

Area 7-3 is located in the northwestern corner of Parcel B. The risk drivers are beryllium, copper, lead, zinc, Aroclor-1260, and the PAHs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene. An additional PAH, dibenz(a,h)anthracene, was added as a target compound based on screening data because the concentration exceeded the ROD cleanup level. The source of the beryllium, Aroclor-1260, and PAHs is unknown. Copper, lead, and zinc contamination may be the result of sandblast grit disposal at IR-07. Lead may also be the result of painting done at IR-07.

In residential exposure area B0824, the total ELCR of 4×10^{-5} is largely the result of potential exposure to PAHs at 1.25 and 3.75 feet bgs, at boring IR07B036. The total HI of 12 is largely the result of potential exposure to copper and zinc at these same depths and at the same boring. Lead was detected at a maximum concentration of 800 mg/kg at 3.75 feet bgs, at this same boring.

In residential exposure area B1024, the ELCR of 1×10^{-4} is

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Beryllium	0.66 to 1.1 at 1.75 to 6.25 feet	9×10^{-6}	NA
Copper	244 at 3.75 feet	NA	1.5
Lead	800 at 3.75 feet	NA	NA
Zinc	3,350 at 3.75 feet	NA	9.0
Aroclor-1260	0.34 at 1.75 feet	7×10^{-5}	NA
Benzo(a)anthracene	0.37 at 3.75 feet	3×10^{-6}	NA
Benzo(a)pyrene	0.24 at 3.75 feet	2×10^{-5} to 6×10^{-6}	NA
Benzo(b)fluoranthene	0.28 at 3.75 feet	9×10^{-6} to 5×10^{-6}	NA
Benzo(k)fluoranthene	0.32 at 3.75 feet	1×10^{-5} to 3×10^{-6}	NA
Chrysene	0.52 at 3.75 feet	2×10^{-6}	NA
Dibenz(a,h)anthracene	screening	NA	NA
Indeno(1,2,3-cd)-pyrene	0.04 at 1.75 feet	1×10^{-6}	NA

largely the result of potential exposure to Aroclor-1260, beryllium, and PAHs at 1.75 to 6.25 feet at boring IR07B011. The HI of 2.4 is largely the result of potential exposure to copper at 3.75 feet bgs at this same boring. (PAHs were detected at low concentrations in both exposure areas.)

Because the ELCR did not meet the residential cleanup goal of 1×10^{-6} , the HI was greater than 1, and the lead concentration was greater than 221 mg/kg (value from EPA model), the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
7,500	5	1,400	11,740	10	5,000	3	1

Notes:

ft² Square feet

yd³ Cubic yards

Data Evaluation and Risk Assessment

After the area was excavated, confirmation samples were collected from the bottom of the excavation and then the excavation bottom and sidewalls were lined with plastic to act as boundary markers and the excavation was backfilled. Confirmation sampling of the sidewalls was done later by digging trenches immediately outside the plastic liners, so that the liners were exposed. The following confirmation results exceeded the ROD cleanup levels at the maximum concentrations listed: lead (300 mg/kg) and Aroclor-1260 (0.014 mg/kg) from the 10 foot bgs bottom sections; copper (554 mg/kg), lead (280 mg/kg), zinc (709 mg/kg), Aroclor-1260 (0.35 mg/kg), and PAHs [2.1 mg/kg for benzo(b)fluoranthene] from sections of the north and south walls; Aroclor-1260 (0.027 mg/kg) from the shallow west wall; and copper (619 mg/kg), zinc (521 mg/kg), Aroclor-1260 (0.29 mg/kg), and PAHs [1.7 mg/kg for benzo(b)fluoranthene] from sections of the east wall.

Because the confirmation results did not meet the ROD cleanup goals, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 5×10^{-5} to 8×10^{-7} HI < 1	ELCR = 3×10^{-5} HI < 1	ELCR = 5×10^{-5} to 9×10^{-7} HI < 1 to 3.9	ELCR = 3×10^{-5} HI = 2.2	ELCR = 2×10^{-5} to 5×10^{-7} HI < 1	ELCR = 4×10^{-6} HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

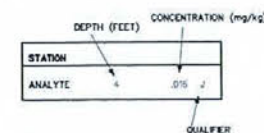
The excavation is in 12 residential exposure area grids; it curves at the northwest due to the beach, and became joined at one corner with excavation 7-4 to the south. The RME carcinogenic risk under the residential scenario, without the produce pathway, is less than 10^{-5} for all residential exposure areas, with the exception of 1025 and 1124. For these residential exposure areas, the RME carcinogenic risk is 4×10^{-5} , and the risk driver is benzo(a)pyrene, which was detected at a maximum concentration of 1 mg/kg. Chemicals detected above their PRGs were benzo(a)pyrene, benzo(a)anthracene (maximum concentration of 1 mg/kg), benzo(b)fluoranthene (2.1 mg/kg), dibenzo(a,h)anthracene (0.063 mg/kg), and Aroclor-1260 (0.35 mg/kg). These chemicals were detected at various locations along the south and east walls of the excavation at depths of 4 feet bgs. The RME hazard indices are less than 1 for all residential exposure areas.

Other Information

None.

Conclusion:

- ✓ Some of the remaining lead in soil at this area is at 10 feet bgs and is covered by 10 feet of clean fill; some lead also remains in the walls.
- ✓ The RME carcinogenic risk using updated guidance, without the produce pathway, is less than 10^{-5} for all residential exposure areas except 1025 and 1124.
- ✓ The RME carcinogenic risk for residential exposure areas 1025 and 1124 is less than 10^{-4} and is attributable primarily to benzo(a)pyrene.
- ✓ The RME hazard indices are less than 1 for all residential exposure areas.



- NOTES:
1. RESULTS MEETING ROD CLEANUP GOAL ARE PRESENTED IN GREEN.
 2. RESULTS MEETING THE 1998 RESIDENTIAL PROs ARE PRESENTED IN BLUE.
 3. RESULTS IN BLACK EXCEED APPLICABLE CRITERIA.

- LEGEND
- DESIGNED REMEDIATION BOUNDARY
 - TOP OF EXCAVATION
 - AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
 - RESIDENTIAL 2500 SQUARE FOOT GRID WITH GRID NUMBER
 - CONFIRMATION SAMPLE LOCATION
 - REMEDIAL INVESTIGATION SAMPLING LOCATION

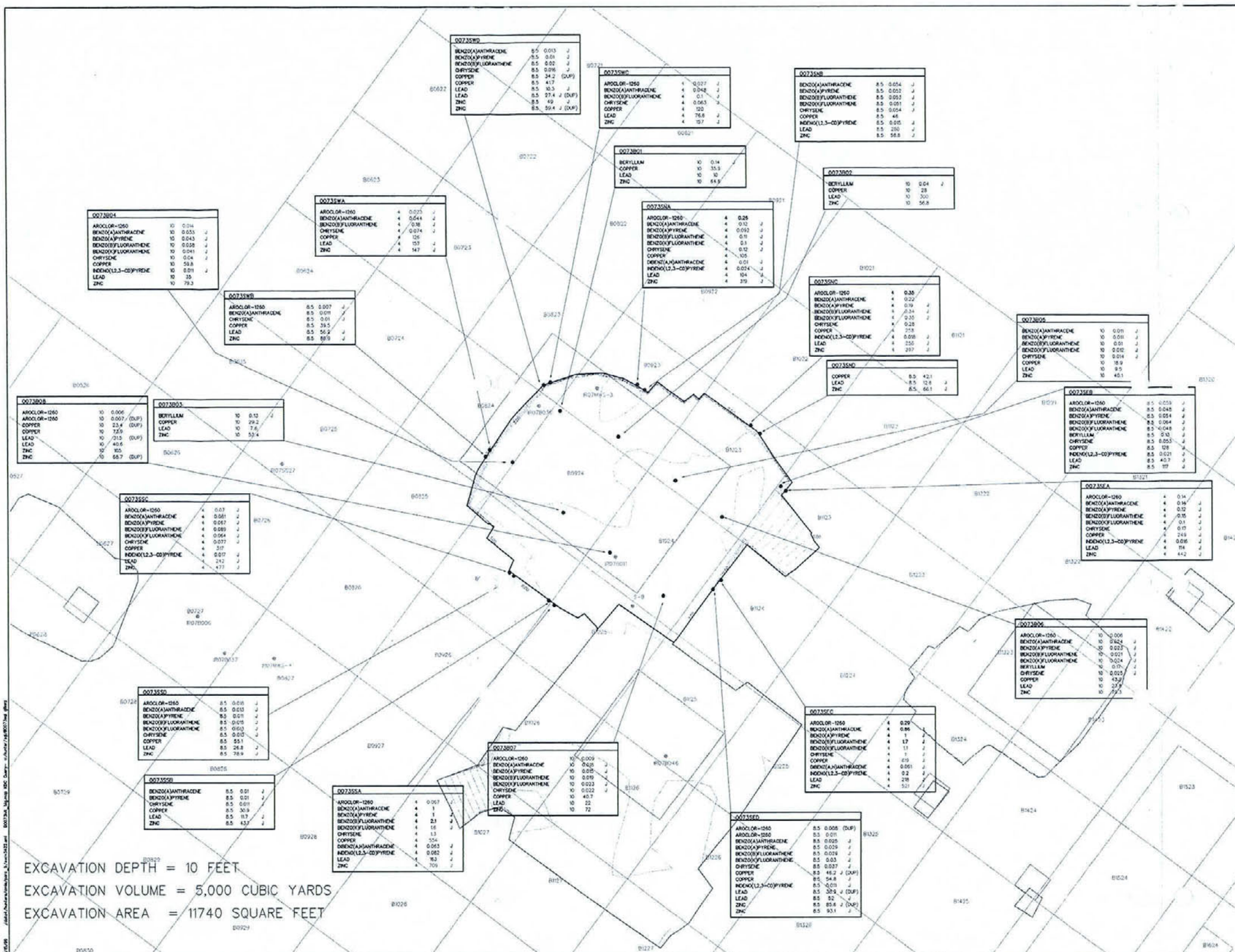
QUALIFIERS:
J - ESTIMATED QUANTITY

SCREENING CRITERIA FOR 1998 RESIDENTIAL PROs AND FOR ROD CLEANUP GOALS:

ANALYTE	ROD GOAL (mg/kg)	PRO (mg/kg)
AROCLO-1260	0.009	0.2
BENZO(A)ANTHRACENE	0.33	0.557
BENZO(A)PYRENE	0.33	0.056
BENZO(B)FLUORANTHENE	0.33	0.557
BENZO(K)FLUORANTHENE	0.33	5.57
BERYLLIUM	0.8	150
CHRYSENE	0.33	55.703
COPPER	157.3	2783.95
DIBENZO(A,H)ANTHRACENE	0.33	0.33
INDENO(1,2,3-CD)PYRENE	0.33	0.557
LEAD	221	400
ZINC	365.4	22455.633



EXCAVATION 7-3
PARCEL B CONSTRUCTION
SUMMARY REPORT
CONFIRMATION SAMPLING
RESULTS SUMMARY
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA



IR-07: DE MINIMIS AREA B0536 (GRID CELL 0536)

Operational History and Site Characterization

De minimis area B0536 is located on the border between IR-07 and IR-18, approximately 230 feet from the western boundary of HPS. The risk driver is beryllium. The source of the beryllium is unknown. Aroclor-1260 was identified during IT's in situ waste characterization and added as a target compound because the concentration was greater than the ROD cleanup goal. TPH-g was also added as a target compound based on IT's screening data because the concentration was greater than the ROD cleanup goal.

The ELCR of 1×10^{-5} is largely the result of potential exposure to beryllium at depths of 2.25 to 6.25 feet bgs at boring IR07B030. The detected concentration of beryllium (1.4

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Beryllium	0.72 to 1.4 at 2.25 to 6.25 feet	1×10^{-5}	NA
Aroclor-1260	0.09 in situ	NA	NA
Gasoline	screen	NA	NA

mg/kg) slightly exceeds its HPAL of 0.71 mg/kg. Because the ELCR did not meet the residential cleanup goal of 1×10^{-6} , the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
64	5	12	236	7	59	3	3

Notes:

ft² Square feet
yd³ Cubic yards

Data Evaluation and Risk Assessment

Event 1. Confirmation results for Aroclor-1260 did not meet the ROD cleanup levels on the excavation bottom (0536B0B) and the north (0536SNB) and east (0536SEB) walls.

Event 2. The excavation was expanded on the north and east walls, and at the bottom to a depth of 7 feet bgs to remove Aroclor-1260, and resampled (0536SNC, 0536SEC, and 0536B0C). The confirmation result from the east wall (0536SEC) did not meet the ROD cleanup level.

Event 3. The excavation was expanded to the east to remove Aroclor-1260 and resampled (0536SED); the confirmation result (12 µg/kg) for this step-out was slightly greater than the ROD cleanup level.

Because the one confirmation result did not meet the ROD cleanup goal, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 6×10^{-8} HI < 1	ELCR = 6×10^{-8} HI < 1	ELCR = 7×10^{-8} HI < 1	ELCR = 7×10^{-8} HI < 1	ELCR = 3×10^{-6} H < 1	ELCR = 1×10^{-8} HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

The excavation is in one residential exposure area grid (B0536). The RME carcinogenic risk using updated guidance under the residential scenario, both with and without the produce pathway, meets the 10^{-6} goal.

Other Information

None.

Conclusion:

✓ Risk using updated guidance meets the residential 10^{-6} cancer risk and an HI of less than 1.

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0536SNB		
AROCLOR-1260	4	0.011

0536SWA				
BERYLLIUM	3.5	0.12	J	

0536B0A				
BERYLLIUM	5	0.24	J	

0536B0B			
AROCLOR-1260	5	0.032	J

0536SSA				
BERYLLIUM	3.5	0.12	J	

0536SSB		
AROCLOR-1260	4	0.007

0536SEB		
AROCLOR-1260	4	0.034

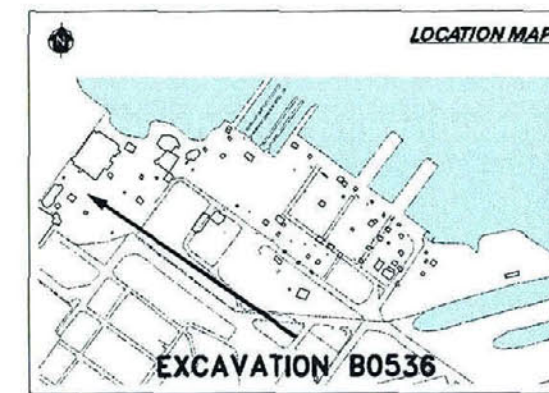
0536SNA				
BERYLLIUM	3.5	0.1	J	

0536SNC		
AROCLOR-1260	4	0.007

0536SEA			
BERYLLIUM	3.5	0.17	J

0536SEC		
AROCLOR-1260	4	0.024

0536SED		
AROCLOR-1260	4	0.012



CONCENTRATION (mg/kg)	DEPTH (FEET)
STATION	ANALYTE
4	.016
J	
QUALIFIER	

NOTES:

1. RESULTS MEETING ROD CLEANUP GOAL ARE PRESENTED IN GREEN.
2. RESULTS MEETING THE 1998 RESIDENTIAL PRG ARE PRESENTED IN BLUE.
3. RESULTS IN BLACK EXCEED APPLICABLE CRITERIA.

LEGEND:

- DESIGNED REMEDIATION BOUNDARY
- TOP OF EXCAVATION
- AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
- RESIDENTIAL 2500 SQUARE FEET GRID WITH GRID NUMBER
- B1617
- CONFIRMATION SAMPLE LOCATION WITH DETECTED RESULTS
- CONFIRMATION SAMPLE LOCATION WITH NON-DETECTED RESULTS
- REMEDIAL INVESTIGATION SAMPLING LOCATION

QUALIFIERS:
J - ESTIMATED QUANTITY

SCREENING CRITERIA FOR 1998 RESIDENTIAL PRGs AND FOR ROD CLEANUP GOALS:

ANALYTE	ROD GOAL (mg/kg)	PRG (mg/kg)
AROCLOR-1260	0.009	0.2
BERYLLIUM	0.8	150



2.5 0 2.5 5
SCALE IN FEET

EXCAVATION DEPTH = 7 FEET
EXCAVATION VOLUME = 59 CUBIC YARDS
EXCAVATION AREA = 236 SQUARE FEET

EXCAVATION B0536
PARCEL B CONSTRUCTION SUMMARY REPORT
CONFIRMATION SAMPLING
RESULTS SUMMARY
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

IR-07: DE MINIMIS AREA B0628 (GRID CELLS 0527, 0528, 0627, 0628, 0727, 0728)

Operational History and Site Characterization

De minimis area B0628 is located in the northwestern corner of Parcel B. The risk drivers are beryllium and Aroclor-1260. The source of the beryllium and Aroclor-1260 are unknown.

The ELCR of 2×10^{-5} is largely the result of potential exposure to Aroclor-1260 at 1.25 feet bgs and beryllium at 3.75 and 6.25 feet bgs at boring IR07B025.

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Beryllium	1.0 at 3.75 feet	8×10^{-6}	NA
Aroclor-1260	0.062 at 1.25 feet	1×10^{-5}	NA

Beryllium was detected at concentrations only slightly above its HPAL of 0.71 mg/kg. Because the ELCR did not meet the residential cleanup goal of 1×10^{-6} , the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
64	2	5	3,406	10	560	8	2

Notes:

ft² Square feet

yd³ Cubic yards

Data Evaluation and Risk Assessment

Event-1. Confirmation results for Aroclor-1260 from the bottom (sample 0628B0A) and all sidewalls (samples 0628SNA, 0628SEA, and 0628SWA) did not meet the ROD cleanup level.

Event 2. The excavation was expanded down to 10 feet bgs to remove Aroclor-1260. The following confirmation results for Aroclor-1260 did not meet the ROD cleanup level: samples 0628SNB (0.040 mg/kg), 0628SEB (0.016 mg/kg), 0628SSB (0.037 mg/kg), and 0628SWB (0.016 mg/kg) from the deeper walls, and samples 0628B0B (0.028 mg/kg) and 0628B0C (0.14 and 0.20 mg/kg) from the excavation bottom.

Because the confirmation results did not meet the ROD cleanup goals, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 1×10^{-6} to 3×10^{-7} HI < 1	ELCR = 9×10^{-7} HI < 1	ELCR = 1×10^{-6} to 3×10^{-7} HI < 1	ELCR = 1×10^{-6} HI < 1	ELCR = 8×10^{-6} to 5×10^{-8} HI < 1	ELCR = 1×10^{-7} HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

The excavation is in six residential exposure area grids. The RME carcinogenic risk using updated guidance under the residential scenario, both with and without the produce pathway, meet the 10^{-6} goal.

Other Information

None.

Conclusion:

✓ Risk using updated guidance meets the residential 10^{-6} cancer risk and an HI of less than 1.

0628B0C				
AROCLOR-1260	10	0.14	(DUP)	
AROCLOR-1260	10	0.2		
BERYLLIUM	10	0.23	J (DUP)	
BERYLLIUM	10	0.36	J	

B0527

0628SWA		
AROCLOR-1260	4	0.046

0628SWB		
AROCLOR-1260	8.5	0.016

B0528

0628SNA		
AROCLOR-1260	4	0.066

B0627

0628SNB			
AROCLOR-1260	8.5	0.04	
BERYLLIUM	8.5	0.26	J

0628SSB		
AROCLOR-1260	8.5	0.037

0628SSA		
AROCLOR-1260	4	0.22

0628B0A		
AROCLOR-1260	7	0.027

0628SEA		
AROCLOR-1260	4	0.072

0628SEB		
AROCLOR-1260	8.5	0.016

0628B0B		
AROCLOR-1260	10	0.028

EXCAVATION DEPTH = 10 FEET
EXCAVATION VOLUME = 560 CUBIC YARDS
EXCAVATION AREA = 3406 SQUARE FEET



CONCENTRATION (mg/kg)	
STATION	DEPTH (FEET)
ANALYTE	4 .016 J
QUALIFIER	

- NOTES:**
1. RESULTS MEETING ROD CLEANUP GOAL ARE PRESENTED IN GREEN.
 2. RESULTS MEETING THE 1998 RESIDENTIAL PRG ARE PRESENTED IN BLUE.
 3. RESULTS IN BLACK EXCEED APPLICABLE CRITERIA.

- LEGEND:**
- DESIGNED REMEDIATION BOUNDARY
 - TOP OF EXCAVATION
 - AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
 - RESIDENTIAL 2500 SQUARE FEET GRID WITH GRID NUMBER
 - B1617
 - CONFIRMATION SAMPLE LOCATION
 - REMEDIAL INVESTIGATION SAMPLING LOCATION

QUALIFIERS:
J - ESTIMATED QUANTITY

SCREENING CRITERIA FOR 1998 RESIDENTIAL PRGs AND FOR ROD CLEANUP GOALS:

ANALYTE	ROD GOAL (mg/kg)	PRG (mg/kg)
AROCLOR-1260	0.009	0.2
BERYLLIUM	0.8	150



5 0 5 10
SCALE IN FEET

**EXCAVATION B0628
PARCEL B CONSTRUCTION SUMMARY REPORT
CONFIRMATION SAMPLING
RESULTS SUMMARY
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA**

IR-07: DE MINIMIS AREA B1132 (GRID CELL 1132, 1133, 1232, 1233)

Operational History and Site Characterization

De minimis area B1132 is located approximately 150 feet west of Building 117, in an open flat area formerly paved with asphalt and used as a parking lot. The risk driver is copper; TPH-d is also a target analyte. The copper contamination may be the result of sandblast grit disposal conducted at IR-07. The TPH contamination may be due to waste oil reportedly released on the ground by Triple A Machine Shop, a private ship repair company that leased 98 percent of HPS from the Navy in 1976.

The HI of 1.5 is largely the result of potential exposure to copper at 3.75 feet bgs at boring IR07B038. Because the HI was greater than 1, and the TPH-d

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Copper	192 at 3.75 feet	NA	1.2
Diesel	1,500 at 3.75 feet	NA	NA

concentration (1,500 mg/kg) at 3.75 feet bgs exceeded the RWQCB cleanup goal of 100 mg/kg, the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
64	4	10	1,485	9	233	8	2

Notes:

ft² Square feet

yd³ Cubic yards

Data Evaluation and Risk Assessment

Event 1. The excavation was expanded in every direction and to a depth of 8 feet based on screening results but confirmation results for TPH-d from the east and west walls, and the shallow (1 to 7 feet bgs) south wall did not meet the ROD cleanup level (samples 1132SEA, 1132SWA, 1132SWB, and 1132SSA).

Event 2. The excavation was expanded at the walls to remove TPH-d, and confirmation samples 1132SEB, 1132SWC, and 1132SSC were collected from the east, west, and south walls, respectively. Confirmation samples were also collected from the surface of a bench (sample 1132B0B), as well as from a newly exposed section of the north wall (sample 1132SNC). The confirmation result from the bench bottom sample was slightly greater than the 100 mg/kg cleanup level for TPH-d.

One of the confirmation results (110 mg/kg) for TPH did not meet the cleanup goal; however, the risk for TPH will be evaluated in the TPH CAP for Parcel B.

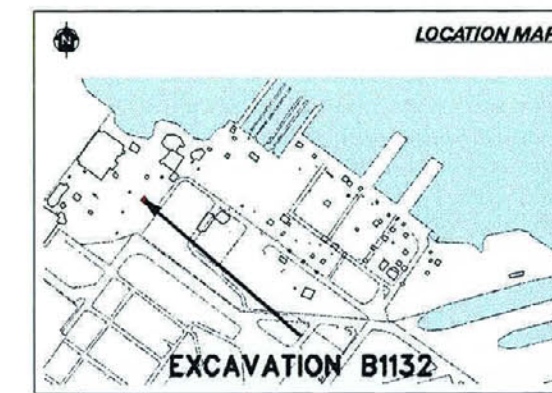
The excavation intersects four residential exposure area grids. The RME carcinogenic risk using updated guidance under the residential scenario, both with and without the produce pathway, meets the 10^{-6} goal. The maximum HI for the RME case, both with and without the produce pathway, is less than 1.

Other Information

None.

Conclusion:

- ✓ The remaining TPH-d contamination will be addressed in the TPH CAP for Parcel B.
- ✓ Risk using updated guidance meets the residential 10^{-6} cancer risk and an HI of less than 1.



CONCENTRATION (mg/kg)		DEPTH (FEET)	
STATION	ANALYTE	4	.016
			J
			QUALIFIER

- NOTES:**
1. RESULTS MEETING ROD CLEANUP GOAL ARE PRESENTED IN GREEN.
 2. RESULTS MEETING THE 1998 RESIDENTIAL PRG ARE PRESENTED IN BLUE.
 3. RESULTS IN BLACK EXCEED APPLICABLE CRITERIA.

- LEGEND:**
- DESIGNED REMEDIATION BOUNDARY
 - TOP OF EXCAVATION
 - AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
 - RESIDENTIAL 2500 SQUARE FEET GRID WITH GRID NUMBER
 - CONFIRMATION SAMPLE LOCATION WITH DETECTED RESULTS
 - CONFIRMATION SAMPLE LOCATION WITH NON-DETECTED RESULTS
 - REMEDIAL INVESTIGATION SAMPLING LOCATION

QUALIFIERS:
J - ESTIMATED QUANTITY

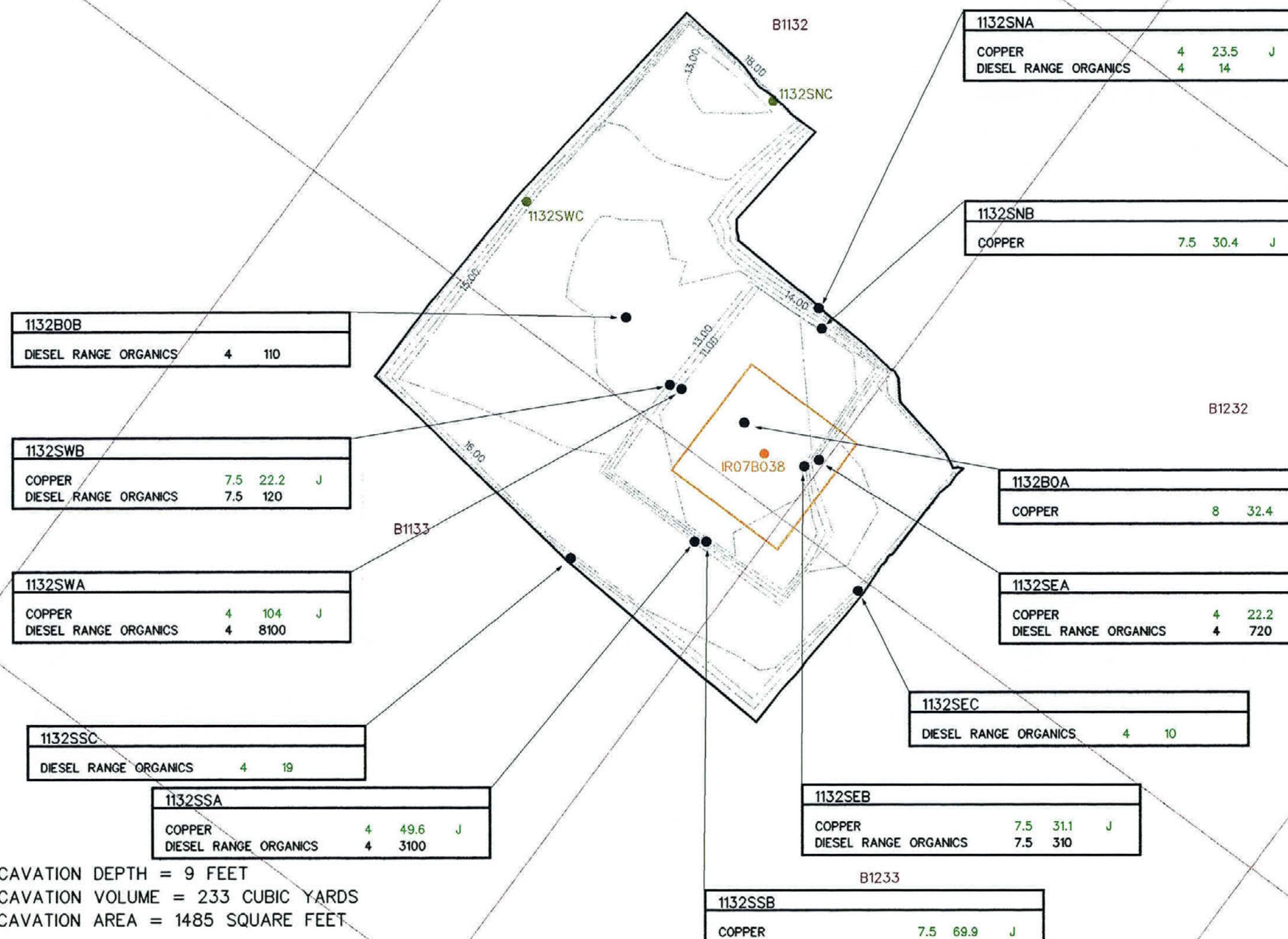
SCREENING CRITERIA FOR 1998 RESIDENTIAL PRGs AND FOR ROD CLEANUP GOALS:

ANALYTE	ROD GOAL (mg/kg)	PRG (mg/kg)
COPPER	157.3	2783.99
DIESEL RANGE ORGANICS	100	N/A



5 0 5 10
SCALE IN FEET

**EXCAVATION B1132
PARCEL B CONSTRUCTION SUMMARY REPORT
CONFIRMATION SAMPLING
RESULTS SUMMARY
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA**



IR-18: AREA 18-2 (GRID CELLS 0137, 0138, 0139, 0140, 0141, 0237, 0238, 0239, 0240, 0241)

Operational History and Site Characterization

Area 18-2 is located along the western boundary of the HPS property line, in an open flat area formerly paved with asphalt and used as a parking lot. The risk drivers are lead, zinc, Aroclor-1254, Aroclor-1260, the PAHs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene, and the semivolatile bis(2-ethylhexyl)phthalate. TPH-d and TPH-mo were also target analytes. The TPH and PAH contamination may be due to waste oil reportedly released on the ground by Triple A Machine Shop, a private ship repair company that leased 98 percent of HPS from the Navy in 1976. The source of the lead, zinc, bis(2-ethylhexyl)phthalate, and PCBs is not known; lead and zinc are typically found at HPS in association with painting operations and sandblasting grit; zinc may also be the result of serpentinite-derived fill material.

The total ELCR of 3×10^{-2} at exposure area B0038 is largely the result of potential exposure to Aroclors and PAHs at 1.25 to 6.25 feet bgs at boring IR18B029, which is located outside of the HPS property line. The total HI of 86 at this location is largely the result of potential exposure to Aroclor-1254 at the same boring. Diesel was detected at 2,600 mg/kg, and motor oil at 17,000 mg/kg, at 2.75 feet bgs at this location. The total ELCR of 8×10^{-4} at exposure area B0040 is largely the result of a potential exposure to Aroclor-1260, PAHs, and bis(2-ethylhexyl)-phthalate at

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Lead	536 at 1.25 feet	NA	NA
Zinc	454 at 1.25 feet	NA	1.2
Aroclor-1254	1.2 at 1.25 feet	3×10^{-3}	85
Aroclor-1260	3.4 at 1.25 feet	7×10^{-4} to 1×10^{-5}	NA
Diesel	2,600 at 2.75 feet	NA	NA
Motor oil	17,000 at 2.75 feet	NA	NA
Benzo(a)anthracene	7.0 at 4.25 feet	6×10^{-5} to 2×10^{-6}	NA
Benzo(a)pyrene	7.8 at 4.25 feet	5×10^{-4} to 1×10^{-5}	NA
Benzo(b)fluoranthene	5.0 at 4.25 feet	2×10^{-4} to 7×10^{-6}	NA
Benzo(k)fluoranthene	5.6 at 4.25 feet	2×10^{-4} to 2×10^{-6}	NA
Chrysene	8.8 at 4.25 feet	4×10^{-5} to 9×10^{-6}	NA
Dibenz(a,h)anthracene	0.35 at 6.25 feet	5×10^{-5}	NA
Indeno(1,2,3-cd)-pyrene	4.0 at 4.25 feet	1×10^{-4} to 2×10^{-6}	NA
bis(2-Ethylhexyl)-phthalate	5.7 at 1.25 feet	5×10^{-6}	NA

1.25 feet bgs at boring IR18B028. The HI of 3.2 at this location is largely the result of potential exposure to zinc at 1.25 feet bgs at boring IR18B028. Lead was detected at a maximum concentration of 536 mg/kg at the same depth and location. The total ELCR of 1×10^{-3} at exposure area B0139 is largely the result of potential exposure to PAHs and Aroclor-1260 at 1.75 (Aroclor-1260 only) and 4.25 feet bgs at boring IR18MW21A. Diesel was detected at 1,100 mg/kg at 6.75 feet at this location.

The area was excavated by IT during the Parcel B remedial action for the following reasons: the ELCRs did not meet the residential cleanup goal of 1×10^{-6} , the HIs exceeded 1, the lead concentration was greater than 221 mg/kg (value from EPA model), the TPH-d concentration at 0 to 10 feet bgs did not meet the RWQCB cleanup level of 100 mg/kg specified in the LUFT manual, and the TPH-mo concentration at 0 to 3 feet bgs exceeded 1,000 mg/kg.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
9,000	7	2,300	11,454	10	4,489	3	1

Notes:

ft² Square feet
yd³ Cubic yards

Data Evaluation and Risk Assessment

The following confirmation results exceeded the ROD cleanup levels:

- PCBs from excavation bottom samples at 10 feet bgs. The maximum concentration was 0.10 mg/kg for Aroclor-1260 in sample 0182B01.
- Lead, PCBs, and PAHs from shallow (1 to 7 feet) and deep (7 to 10 feet) sections of the east wall. The maximum concentrations were lead at 333 mg/kg, Aroclor-1260 at 0.021 mg/kg, and the PAH chrysene at 0.90 mg/kg.
- PCBs from sections of the shallow and deep north and south walls. The maximum concentration was 1.6 mg/kg for Aroclor-1260 in sample 0182SSC.

- Lead, zinc, and PCBs from sections of the shallow and deep west walls. The maximum concentrations were lead at 601 mg/kg, zinc at 629 mg/kg, and Aroclor-1260 at 2.0 mg/kg (sample 0182SWE).

(Note that Aroclor-1254 was reported as nondetected at reporting limits exceeding the cleanup level for several samples since dilutions were required due to the high concentrations of Aroclor-1260 in the samples.)

Because the confirmation results did not meet the ROD cleanup goals, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 3×10^{-4} to 2×10^{-6} HI < 1	ELCR = 1×10^{-5} HI < 1	ELCR = 3×10^{-4} to 2×10^{-6} HI < 1 to 1.7	ELCR = 2×10^{-5} HI < 1	ELCR = 7×10^{-6} to 2×10^{-6} HI < 1	ELCR = 2×10^{-6} HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

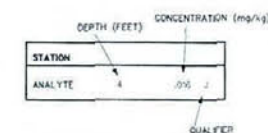
The excavation is in ten residential exposure area grids (two are shared with excavation 18-1, and two with 18-3). The RME carcinogenic risk using updated guidance under the residential scenario without the produce pathway is within the 10^{-4} to 10^{-6} range for all ten residential exposure grids. The RME HI, without the produce pathway, is less than 1 for all ten residential exposure area grids. Aroclor-1260 was detected at concentrations greater than the 1998 residential PRG in four samples at various locations in the excavation, mostly along the western wall at depths of 4 to 8.5 feet bgs (maximum concentration 2 mg/kg). Benzo(a)pyrene was detected at concentrations greater than the 1998 residential PRG in five samples (maximum concentration 0.78 mg/kg), at depths of 4 to 10 feet bgs. Benzo(a)anthracene and benzo(k)fluoranthene were detected at concentrations (0.72 and 0.67 mg/kg) greater than the 1998 residential PRG in sample 0182SEH at a depth of 8.5 feet. Lead was detected at a concentration (601 mg/kg) greater than its 1998 residential PRG in sample 0182SWE on the south end of the west excavation wall.

Other Information







None.

Conclusion:

- ✓ TPH concentrations meet the RWQCB cleanup levels.
- ✓ Some of the remaining PCB contamination is at 10 feet bgs and along the western wall at the HPS property boundary.
- ✓ The portion of 18-2 on the neighboring property was not excavated; lead, zinc, and PCB contamination remain on the west wall of the excavation on the HPS property.
- ✓ Some lead also remains on the east wall and near the southern end of the western wall.
- ✓ The RME carcinogenic risk using updated guidance without the produce pathway for all ten residential exposure grids is within the 10^{-4} to 10^{-6} range.
- ✓ The RME hazard index without the produce pathway is less than 1 for all ten residential exposure grids.



- NOTES:
1. RESULTS MEETING RFO CLEANUP GOAL ARE PRESENTED IN GREEN
 2. RESULTS MEETING THE 1996 RESIDENTIAL PRG ARE PRESENTED IN BLUE.
 3. RESULTS IN BLACK EXCEED APPLICABLE CRITERIA.

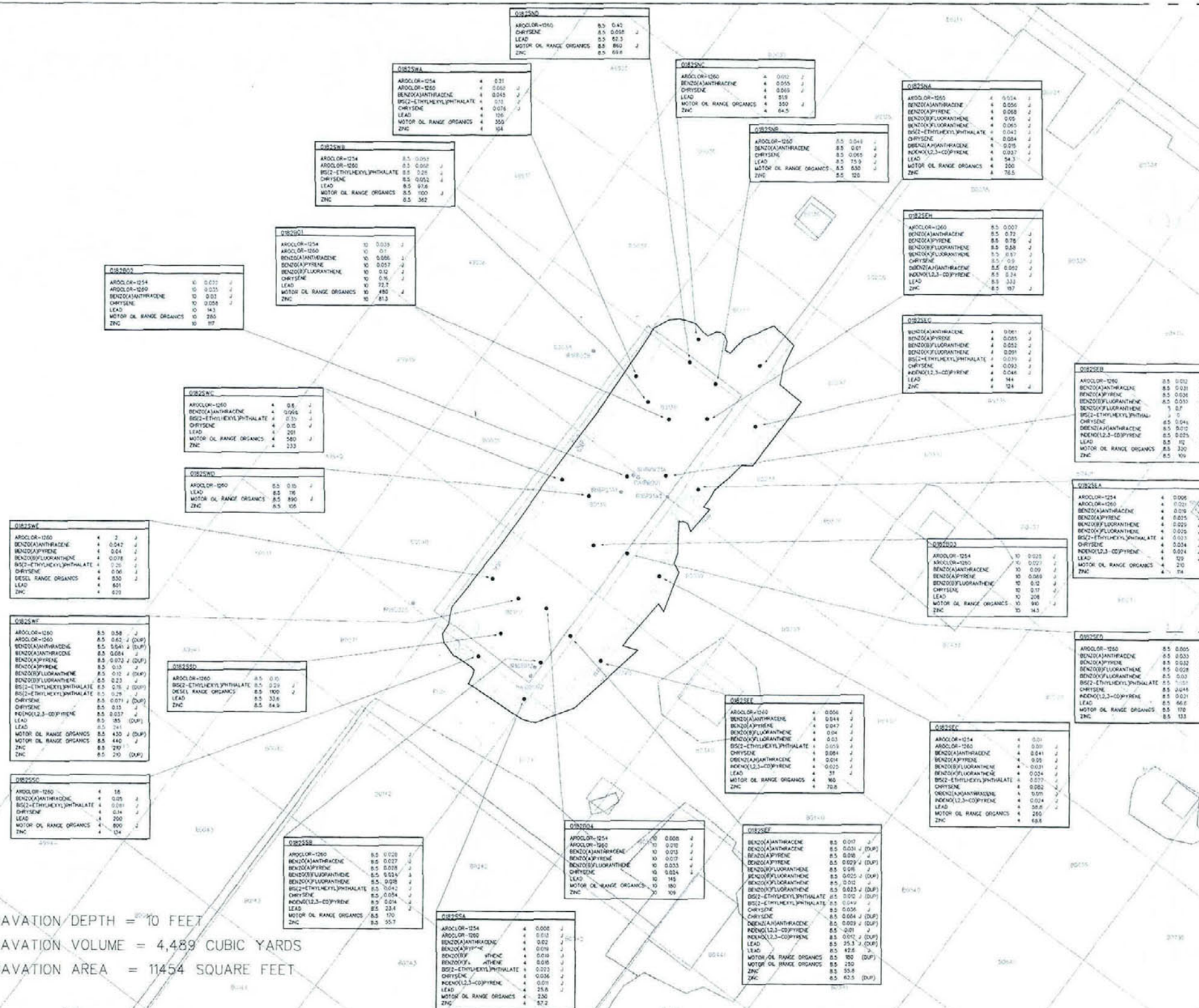
- LEGEND**
-  DESIGNED REMEDIATION BOUNDARY
 -  TOP OF EXCAVATION
 -  AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
 -  RESIDENTIAL 2500 SQUARE FEET GRID WITH GRID NUMBER
 -  CONFIRMATION SAMPLE LOCATION
 -  REMEDIAL INVESTIGATION SAMPLING LOCATION

QUALIFIERS:
J - ESTIMATED QUANTITY

SCREENING CRITERIA FOR 1998 RESIDENTIAL PPG1 AND FOR ROD CLEANUP GOALS:		
ANALYTE	ROD COAL (mg/kg)	PPG (mg/kg)
ARCOLOR-1254	0.009	0.2
ARCOLOR-1260	0.009	0.2
ANTHRA[1,2,3-cd]ANTHRACENE	0.35	0.557
BENZO[a]PYRENE	0.35	0.066
BENZO[b]FLUORANTHENE	0.35	0.557
BENZO[k]FLUORANTHENE	0.35	0.57
BS[1,2-ETHYLENE]DIBENZOTHALES	N/A	3170
CHRYSENE	0.35	50.03
DIBENZO[a,h]ANTHRACENE	0.35	N/A
DIENYL RING ORGANICS	100	N/A
INDENO[1,2,3-cd]PYRENE	0.35	0.557
LEAD	221	400
MOTOR OIL RANGE ORGANICS	N/A	2448.53
ZINC	500	4



 EXCAVATION 18-2
 PARCEL B CONSTRUCTION
 SUMMARY REPORT
 CONFIRMATION SAMPLING
 RESULTS SUMMARY
 HUNTERS POINT SHIPYARD
 SAN FRANCISCO, CALIFORNIA



IR-18: DE MINIMIS AREA B0337 (GRID CELLS 0337, 0338, 0437, 0438)

Operational History and Site Characterization

De minimis area B0337 is located approximately 150 feet from the western boundary of HPS, in an open flat area formerly paved with asphalt and used as a parking lot. The risk drivers are Aroclor-1260 and lead. The source of Aroclor-1260 at IR-18 is not known. The source of lead at B0337 is also not known; however, it is typically found at HPS in association with painting operations and sandblasting grit.

The total ELCR of 3×10^{-5} is largely the result of potential exposure to Aroclor-1260 at 6.75 feet bgs at boring IR18B015. Lead was detected

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Aroclor-1260	0.12 at 6.75 feet	3×10^{-5}	NA
Lead	233 at 1.75 feet	NA	NA

at a concentration of 233 mg/kg at 1.75 feet bgs at the same location. Because the ECLR exceeded the residential cleanup goal of 1×10^{-6} , and the lead concentration was greater than 221 mg/kg (value from EPA model), the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
64	7	17	1,930	10	49	3	1

Notes:

ft² Square feet
yd³ Cubic yards

Data Evaluation and Risk Assessment

After the area was excavated, the following confirmation results exceeded the ROD cleanup levels: Aroclor-1260 from the deep (7 to 10 feet) north and south walls (samples 0337SNB and 0337SSB), and the shallow (1 to 7 feet) and deep east and west walls (samples 0337SEA, 0337SEB, 02337SWA, and 0337SWB); and lead at the excavation bottom at 10 feet (sample 0337B0A).

Because the confirmation results did not meet the ROD cleanup goals, further evaluation of the risk was conducted. Since the lead contamination (478 mg/kg) is at 10 feet bgs, no further action will be taken to remove lead.

Because the one confirmation result did not meet the ROD cleanup goal, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 7×10^{-7} to 3×10^{-7} HI < 1	ELCR = 4×10^{-7} HI < 1	ELCR = 8×10^{-7} to 3×10^{-7} HI < 1	ELCR = 5×10^{-7} HI < 1	ELCR = 2×10^{-6} to 1×10^{-6} HI < 1	ELCR = 7×10^{-8} HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

The excavation intersects four residential exposure area grids. The RME carcinogenic risk meets the 10^{-6} goal using updated guidance under the residential scenario, both with and without the produce pathway.

Other Information

None.

Conclusion:

- ✓ The remaining lead in soil at this de minimis area is at 10 feet bgs and is covered by 10 feet of clean fill.
- ✓ Risk using updated guidance meets the residential 10^{-6} cancer risk and an HI of less than 1.

0337SWB				
AROCLOR-1260	8.5	0.1		
AROCLOR-1260	8.5	0.1	(DUP)	
LEAD	8.5	17.8	J	
LEAD	8.5	45.3	J (DUP)	

B0337 0337SWA				
AROCLOR-1260	4	0.016		
LEAD	4	16.4	J	

0337SNA				
AROCLOR-1260	4	0.005		
LEAD	4	59	J	

0337SNB				
AROCLOR-1260	8.5	0.14		
LEAD	8.5	50.2	J	

0337BOA				
AROCLOR-1260	10	0.009		
LEAD	10	478	J	

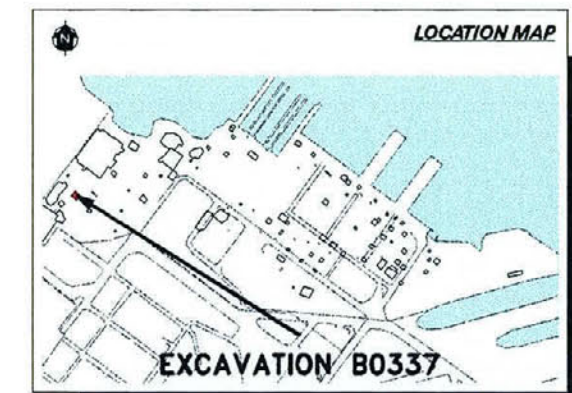
0337SEB				
AROCLOR-1260	8.5	0.061		
LEAD	8.5	30.1	J	

0337SEA				
AROCLOR-1260	4	0.011		
LEAD	4	45.9	J	

0337SSB				
AROCLOR-1260	8.5	0.021		
LEAD	8.5	69	J	

0337SSA				
AROCLOR-1260	4	0.006		
LEAD	4	39	J	

EXCAVATION DEPTH = 10 FEET
EXCAVATION VOLUME = 49 CUBIC YARDS
EXCAVATION AREA = 1930 SQUARE FEET



CONCENTRATION (mg/kg)	
DEPTH (FEET)	
STATION	
ANALYTE	4 .016 J
QUALIFIER	

NOTES:

1. RESULTS MEETING ROD CLEANUP GOAL ARE PRESENTED IN GREEN.
2. RESULTS MEETING THE 1998 RESIDENTIAL PRG ARE PRESENTED IN BLUE.
3. RESULTS IN BLACK EXCEED APPLICABLE CRITERIA.

LEGEND:

- DESIGNED REMEDIATION BOUNDARY
- TOP OF EXCAVATION
- AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
- RESIDENTIAL 2500 SQUARE FEET GRID WITH GRID NUMBER
- CONFIRMATION SAMPLE LOCATION
- REMEDIAL INVESTIGATION SAMPLING LOCATION

QUALIFIERS:
J - ESTIMATED QUANTITY

SCREENING CRITERIA FOR 1998 RESIDENTIAL PRGs AND FOR ROD CLEANUP GOALS:			
ANALYTE	ROD GOAL (mg/kg)	PRG (mg/kg)	
AROCLOR-1260	0.009	0.2	
LEAD	221	400	



EXCAVATION B0337
PARCEL B CONSTRUCTION SUMMARY REPORT
CONFIRMATION SAMPLING
RESULTS SUMMARY
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

IR-18: DE MINIMIS AREA B0638 (GRID CELLS 0636, 0738)

Operational History and Site Characterization

De minimis area B0638 is located approximately 300 feet east of the western boundary of HPS, in an open flat area formerly paved with asphalt and used as a parking lot. The risk drivers are 4,4'-DDT, 4,4'-DDD, and the PAHs benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene. The PAH contamination may be due to waste oil reportedly released on the ground by Triple A Machine Shop, a private ship repair company that leased 98 percent of HPS from the Navy in 1976. The specific source of the DDT, banned in the U.S. in 1972, is not known.

The total ELCR of 2×10^{-5} is largely the result of potential exposure to PAHs, 4,4'-DDD, and 4,4'-DDT at 4.25 feet (4,4'-DDD only) and 6.75 feet bgs at boring IR18B019.

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Benzo(a)pyrene	0.10 at 6.75 feet	6×10^{-6}	NA
Benzo(b)fluoranthene	0.18 at 6.75 feet	6×10^{-6}	NA
Indeno(1,2,3-cd)-pyrene	0.06 at 6.75 feet	2×10^{-6}	NA
4,4'-DDD	0.28 at 6.75 feet	2×10^{-6}	NA
4,4'-DDT	0.046 at 6.75 feet	1×10^{-6}	NA

Because the ELCR did not meet the residential cleanup goal of 1×10^{-6} , the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
64	7	17	646	7	126	3	2

Notes:

ft² Square feet
yd³ Cubic yards

Data Evaluation and Risk Assessment

Event 1. Confirmation results for 4,4'-DDD from the south wall (0638SSA), and 4,4'-DDD and 4,4'-DDT from the west wall (0638SWA), did not meet the ROD cleanup levels.

Event 2. The excavation was expanded at the south and west walls. Confirmation results for 4,4'-DDD from the south wall (0638SSB) and for 4,4'-DDT from the west wall (0638SWB) still did not meet the ROD cleanup levels.

Event 3. The excavation was expanded again at the south and west walls. 4,4'-DDD was added as a target compound for the step on the west wall based on screening data. The confirmation result (2,100 ug/kg) for 4,4'-DDD from the south wall was greater than the result for the previous step-out and still did not meet the ROD cleanup level.

Because one of the confirmation results did not meet the ROD cleanup goals, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 6×10^{-6} to 7×10^{-8} HI < 1	ELCR = 2×10^{-6} HI < 1	ELCR = 9×10^{-6} to 8×10^{-8} HI < 1 to 1.6	ELCR = 2×10^{-6} HI < 1	ELCR = 1×10^{-6} HI < 1	ELCR = 1×10^{-7} HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

The excavation covers portions of two residential exposure area grids, 0638 and 0738. For residential exposure area 0738, the RME carcinogenic risk using updated guidance under the residential scenario meet the 10^{-6} goal and the HI is less than 1. For residential exposure area 0636, all detected concentrations are less than 1998 PRGs. With produce, the maximum segregated HI is 1.6; without produce, the maximum segregated HI is less than 1.

Other Information

None.

Conclusion:

- ✓ Risk using updated guidance meets the residential 10^{-6} cancer risk and HI or less than 1 for residential exposure grid 0738.
- ✓ All detected concentrations in de minimis area B0638 are less than 1998 PRGs.

0638SWA			
4,4-DDD	4	0.36	
4,4-DDT	4	0.061	

0638SWB			
4,4-DDD	4	0.078	
4,4-DDT	4	0.048	

0638SWC			
4,4-DDD	4	0.086	

0638SSA			
4,4-DDD	4	0.19	
4,4-DDT	4	0.031	

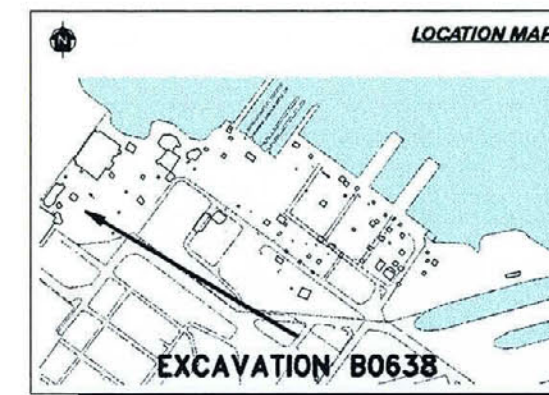
0638SSB			
4,4-DDD	4	0.28	

0638SSC			
4,4-DDD	4	2.1	

0638B0A					
4,4-DDD	7	0.16			
4,4-DDT	7	0.034			
BENZO(A)PYRENE	7	0.019	J		
BENZO(B)FLUORANTHENE	7	0.016	J		
INDENO(1,2,3-CD)PYRENE	7	0.016	J		

0638SNA					
4,4-DDD	4	0.095	J		
4,4-DDT	4	0.023	J		

0638SEA			
4,4-DDD	4	0.13	
4,4-DDT	4	0.02	



CONCENTRATION (mg/kg)			
DEPTH (FEET)			
STATION			
ANALYTE	4	0.016	J
QUALIFIER			

- NOTES:**
1. RESULTS MEETING ROD CLEANUP GOAL ARE PRESENTED IN GREEN.
 2. RESULTS MEETING THE 1998 RESIDENTIAL PRG ARE PRESENTED IN BLUE.

- LEGEND:**
- DESIGNED REMEDIATION BOUNDARY
 - TOP OF EXCAVATION
 - AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
 - RESIDENTIAL 2500 SQUARE FEET GRID WITH GRID NUMBER
 - B1617
 - CONFIRMATION SAMPLE LOCATION
 - REMEDIAL INVESTIGATION SAMPLING LOCATION

QUALIFIERS:
J - ESTIMATED QUANTITY

SCREENING CRITERIA FOR 1998 RESIDENTIAL PRGs AND FOR ROD CLEANUP GOALS:

ANALYTE	ROD GOAL (mg/kg)	PRG (mg/kg)
4,4'-DDD	0.166	2.356
4,4'-DDT	0.04	1.663
BENZO(A)PYRENE	0.33	0.056
BENZO(B)FLUORANTHENE	0.33	0.557
INDENO(1,2,3-CD)PYRENE	0.33	0.557



2.5 0 2.5 5
SCALE IN FEET

EXCAVATION DEPTH = 7 FEET
EXCAVATION VOLUME = 126 CUBIC YARDS
EXCAVATION AREA = 646 SQUARE FEET

EXCAVATION B0638
PARCEL B CONSTRUCTION SUMMARY REPORT
CONFIRMATION SAMPLING
RESULTS SUMMARY
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

IR-23: AREA 23-1 (GRID CELLS 1517, 1518)

Operational History and Site Characterization

Area 23-1 is located adjacent to the former saltwater pumphouse (Building 145). The risk drivers are copper and zinc. TPH-d and TPH-mo are also target analytes. The copper and zinc contamination may be related to previous activities at Building 145, since concentrations decreased significantly with depth in the soil boring at this location. The source of the TPH contamination is not known.

The total HI is the result of potential exposure to copper (HI=8.6) and zinc (HI=1.1) at 1.75 feet bgs at boring IR23B015. TPH-mo was detected at a concentration

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Copper	1,200 at 1.75 feet	NA	8.6
Zinc	420 at 1.75 feet	NA	1.1
Diesel	140 at 6.75 feet	NA	NA
Motor oil	1,400 at 1.75 feet	NA	NA

greater than the screening level at 1.75 feet bgs in boring IR23B015; concentrations decreased significantly at greater depths. Benzene, toluene, ethylbenzene, xylenes, PAHs, and other specific chemicals that may be related to petroleum contamination were not found at any depths (down to 21.75 feet bgs) in boring IR23B015. A Hydropunch groundwater sample was collected from boring IR23B015 from a screened interval 11 to 14 feet bgs. This sample contained TPH-d (1,300 µg/L), TPH-mo (630 µg/L), and TPH-g (50 µg/L).

Because the HI was greater than 1, the TPH-mo concentration at 0 to 3 feet bgs was greater than 1,000 mg/kg, and TPH-d might also be present in the soil at concentrations greater than the screening level, the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
400	3	40	585	6	45	0	1

Notes:

ft² Square feet
yd³ Cubic yards

Data Evaluation and Risk Assessment

The confirmation result (158 mg/kg) for copper from the west wall (the average of the field duplicate pair results for sample 0231SWA) was greater than the ROD cleanup level. Because this confirmation result did not meet the ROD cleanup goal, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 3×10^{-5} HI < 1	ELCR = 0×10^0 HI < 1	ELCR = 3×10^{-5} HI = 3.4	ELCR = 0×10^0 HI = 1.0	ELCR = 7×10^{-6} HI < 1	ELCR = 0×10^0 HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

The excavation is in two residential exposure area grids, and became joined with excavation 23-3 to the north. The RME carcinogenic risk using updated guidance under the residential scenario, both with and without the produce pathway, is within the 10^{-6} to 10^{-4} range. The risk drivers are PAHs, which were not detected in the confirmation samples collected from excavation 23-1, but rather in the fuel line confirmation samples located in exposure area B1518. The maximum segregated hazard index, without the ingestion of the produce pathway, is less than 1.

Other Information

Although all confirmation results for TPH met the soil cleanup goals, possible TPH contamination of groundwater at this area will be addressed by the CAP.

Conclusion:

- ✓ Risk using updated guidance, both with and without the produce pathway, is within the 10^{-6} to 10^{-4} range.
- ✓ The maximum segregated hazard index, without the ingestion of produce pathway, is less than 1.

B1417

B1517

B1617

B1518

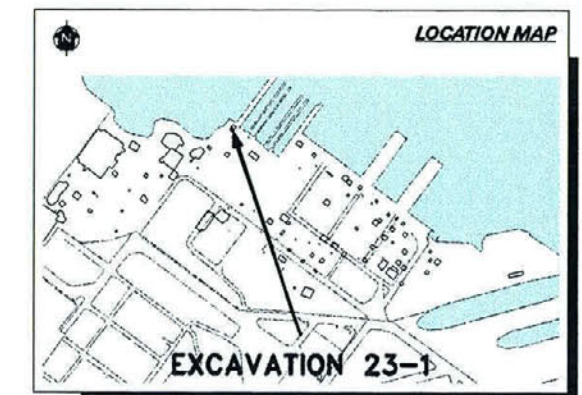
0231SWA				
COPPER	4	154	J	
COPPER	4	163	J (DUP)	
MOTOR OIL RANGE ORGANICS	4	330	(DUP)	
MOTOR OIL RANGE ORGANICS	4	520	J	
ZINC	4	106	(DUP)	
ZINC	4	90.2		

0231SSA				
COPPER	4	67.9	J	
MOTOR OIL RANGE ORGANICS	4	220		
ZINC	4	44.2		

0231B0A				
COPPER	6	118	J	
MOTOR OIL RANGE ORGANICS	6	310		
ZINC	6	52.9		

0231SEA				
COPPER	4	27.1	J	
MOTOR OIL RANGE ORGANICS	4	250		
ZINC	4	37.4		

EXCAVATION DEPTH = 6 FEET
EXCAVATION VOLUME = 45 CUBIC YARDS
EXCAVATION AREA = 585 SQUARE FEET



CONCENTRATION (mg/kg)		DEPTH (FEET)	
STATION			
ANALYTE	4	.016	J
QUALIFIER			

NOTES:

1. RESULTS MEETING ROD CLEANUP GOAL ARE PRESENTED IN GREEN.
2. RESULTS MEETING THE 1998 RESIDENTIAL PRG ARE PRESENTED IN BLUE.
3. RESULTS IN BLACK EXCEED APPLICABLE CRITERIA.

LEGEND:

- DESIGNED REMEDIATION BOUNDARY
- TOP OF EXCAVATION
- AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
- RESIDENTIAL 2500 SQUARE FEET GRID WITH GRID NUMBER
- CONFIRMATION SAMPLE LOCATION
- REMEDIAL INVESTIGATION SAMPLING LOCATION

QUALIFIERS:
J - ESTIMATED QUANTITY

SCREENING CRITERIA FOR 1998 RESIDENTIAL PRGs AND FOR ROD CLEANUP GOALS:

ANALYTE	ROD GOAL (mg/kg)	PRG (mg/kg)
COPPER	157.3	2783.99
MOTOR OIL RANGE ORGANICS	N/A	N/A
ZINC	365.4	22485.633



5 0 5 10
SCALE: 1" = 10'

EXCAVATION 23-1
PARCEL B CONSTRUCTION SUMMARY REPORT
CONFIRMATION SAMPLING
RESULTS SUMMARY
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

IR-23: AREA 23-2 (GRID CELLS 1621, 1721)

Operational History and Site Characterization

Area 23-2 is located beneath railroad tracks about 75 feet northeast of Building 146 (the Tactical Air Navigation Facility). The risk drivers are beryllium and manganese. The source of the contamination is not known.

The total ELCR of 1×10^{-5} is the result of potential exposure to beryllium at 1.75, 3.75, and 6.75 feet bgs at boring IR07B017. The highest

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Beryllium	2 at 1.75 feet	1×10^{-5}	NA
Manganese	5,100 at 1.75 feet	NA	2.3

beryllium concentration detected was 1.5 mg/kg at 1.75 feet bgs, approximately twice the HPAL. Beryllium concentrations were greater than the HPAL at all depths sampled in boring IR07B017 down to 31.25 feet bgs; the uniformity of beryllium concentrations with depth suggests that the occurrence of this metal at IR07B017 may be natural.

The total HI of 3.1 is largely the result of potential exposure to manganese (HI=2.3) at 1.75 feet bgs at the same location; concentrations at other depths were significantly lower.

Because the ELCR did not meet the residential cleanup goal of 1×10^{-6} , and the HI exceeded 1, the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
440	3	40	637	3	83	2	1

Notes:

ft² Square feet

yd³ Cubic yards

Data Evaluation and Risk Assessment

The confirmation results (9500 and 2580 mg/kg) for manganese from the south wall (sample 0232SSA) and the excavation bottom (0232B0A), were greater than the ROD cleanup level. Because the confirmation results did not meet the ROD cleanup goal, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 1×10^{-9} HI = 3.5	ELCR = 0×10^0 HI = 3.0	ELCR = 1×10^{-9} HI = 12	ELCR = 0×10^0 HI = 12	ELCR = 1×10^{-6} HI < 1	ELCR = 0×10^0 HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

The excavation is in two residential exposure area grids (B1621 and B1721). The RME carcinogenic risk using updated guidance under the residential scenario, both with and without the produce pathway, meet the 10^{-6} goal.

Other Information

None.

Conclusion:

✓ Risk using updated guidance meets the residential 10^{-6} cancer risk and an HI of less than 1.

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0232SWA				
BERYLLIUM	2	0.26	J	
MANGANESE	2	1270		

B1621

0232B0A				
BERYLLIUM	3	0.42	J	
MANGANESE	3	2580		

0232SSA				
BERYLLIUM	2	0.29	J	
MANGANESE	2	9500		

0232SNA				
BERYLLIUM	2	0.34	J	
MANGANESE	2	1580		

0232SEA				
MANGANESE	2	1250		

B1721

EXCAVATION DEPTH = 3 FEET
EXCAVATION VOLUME = 83 CUBIC YARDS
EXCAVATION AREA = 637 SQUARE FEET



CONCENTRATION (mg/kg)		DEPTH (FEET)	
STATION		ANALYTE	
		4	.016 J
		QUALIFIER	

NOTES:

1. RESULTS MEETING ROD CLEANUP GOAL ARE PRESENTED IN GREEN.
2. RESULTS MEETING THE 1998 RESIDENTIAL PRG ARE PRESENTED IN BLUE.
3. RESULTS IN BLACK EXCEED APPLICABLE CRITERIA.

LEGEND:

- ABANDONED RAILROAD
- DESIGNED REMEDIATION BOUNDARY
- TOP OF EXCAVATION
- AS-BUILT EXCAVATION CONTOUR (CONTOUR ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL)
- RESIDENTIAL 2500 SQUARE FEET GRID WITH GRID NUMBER
- CONFIRMATION SAMPLE LOCATION
- REMEDIATION INVESTIGATION SAMPLING LOCATION

QUALIFIERS:
J - ESTIMATED QUANTITY

SCREENING CRITERIA FOR 1998 RESIDENTIAL PRGs AND FOR ROD CLEANUP GOALS:

ANALYTE	ROD GOAL (mg/kg)	PRG (mg/kg)
BERYLLIUM	0.8	150
MANGANESE	2264.1	N/A



2.5 0 2.5 5
SCALE IN FEET

EXCAVATION 23-2
PARCEL B CONSTRUCTION SUMMARY REPORT
CONFIRMATION SAMPLING
RESULTS SUMMARY
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

IR-60: AREA 60-2 (GRID CELLS 1918, 1919, 2018, 2019)

Operational History and Site Characterization

Area 60-2 is located beneath railroad tracks that run out to Dry Dock 6 approximately 70 feet away. The risk drivers are arsenic and zinc. Cadmium and copper were identified during in situ waste characterization and added to the target compound list because concentrations were greater than the ROD cleanup goals. TPH-d was also added as a target analyte due to IT visual and olfactory field observations. The metals do not appear related to known activities at IR-60, but were detected in several exposure areas.

The total ELCR of 9×10^{-5} results almost entirely from potential exposure to arsenic at 6.25 feet bgs at boring IR60MW10A. The total HI of 3.4 is largely the result of potential exposure to arsenic and

Area Risk Drivers	Maximum Detection (mg/kg)	Associated Risk (Residential Carcinogenic)	Associated Hazard Indices
Arsenic	21 at 6.25 feet	9×10^{-5}	1.3
Cadmium	in situ	NA	NA
Copper	in situ	NA	NA
Zinc	170 at 6.25 feet	NA	1.1
Diesel	field observation	NA	NA

zinc at 6.25 feet bgs and cadmium (and thallium) at 1.25 feet bgs at this same location. Arsenic was detected at a concentration of 21.1 mg/kg, approximately twice the HPAL.

Because the ELCR did not meet the residential cleanup goal of 1×10^{-6} ; and the HI exceeded 1, the area was excavated by IT during the Parcel B remedial action.

Remedial Action

Design			As-Built				
Area (ft ²)	Depth (feet)	Volume (yd ³)	Area (ft ²)	Depth (feet)	Volume (yd ³)	Number of Step-outs	Number of Confirmation Sampling Events
400	7	100	2,177	8	365	3	2

Notes:

ft² Square feet
yd³ Cubic yards

Data Evaluation and Risk Assessment

Event 1. Confirmation results for copper and zinc from the shallow (1 to 7 feet bgs) east, south, and west walls (samples 0602SEA, 0602SSA, and 0602SWA) exceeded the ROD cleanup levels.

Event 2. The excavation was expanded at the walls to remove copper and zinc, and samples 0602SEB, 0602SSB/0602SSC, and 0602SWB were collected from the east, south, and west walls, respectively. The confirmation result (484 mg/kg) for copper from the west wall exceeded the ROD cleanup level.

Because one of the confirmation results did not meet the ROD cleanup goals, further evaluation of the risk was conducted.

Further Evaluation of Residential Risk				Industrial Risk	
Without Produce Pathway by Exposure Area	Without Produce Pathway by Excavation	With Produce Pathway by Exposure Area	With Produce Pathway by Excavation	By Exposure Area	By Excavation
ELCR = 0×10^0 HI < 1	ELCR = 0×10^0 HI < 1	ELCR = 0×10^0 HI < 1 to 3.0	ELCR = 0×10^0 HI = 2.1	ELCR = 0×10^0 HI < 1	ELCR = 0×10^0 HI < 1

Notes:

ELCR Excess lifetime cancer risk is evaluated using current guidance and the same residential and industrial grid systems as the human health risk assessment performed for the remedial investigation. Noncancer health are evaluated using hazard indices (HI); HI value not exceeding unity are considered to be without significant risk of adverse noncancer health effects. A range in risk values indicates that the excavation spans two or more exposure areas.

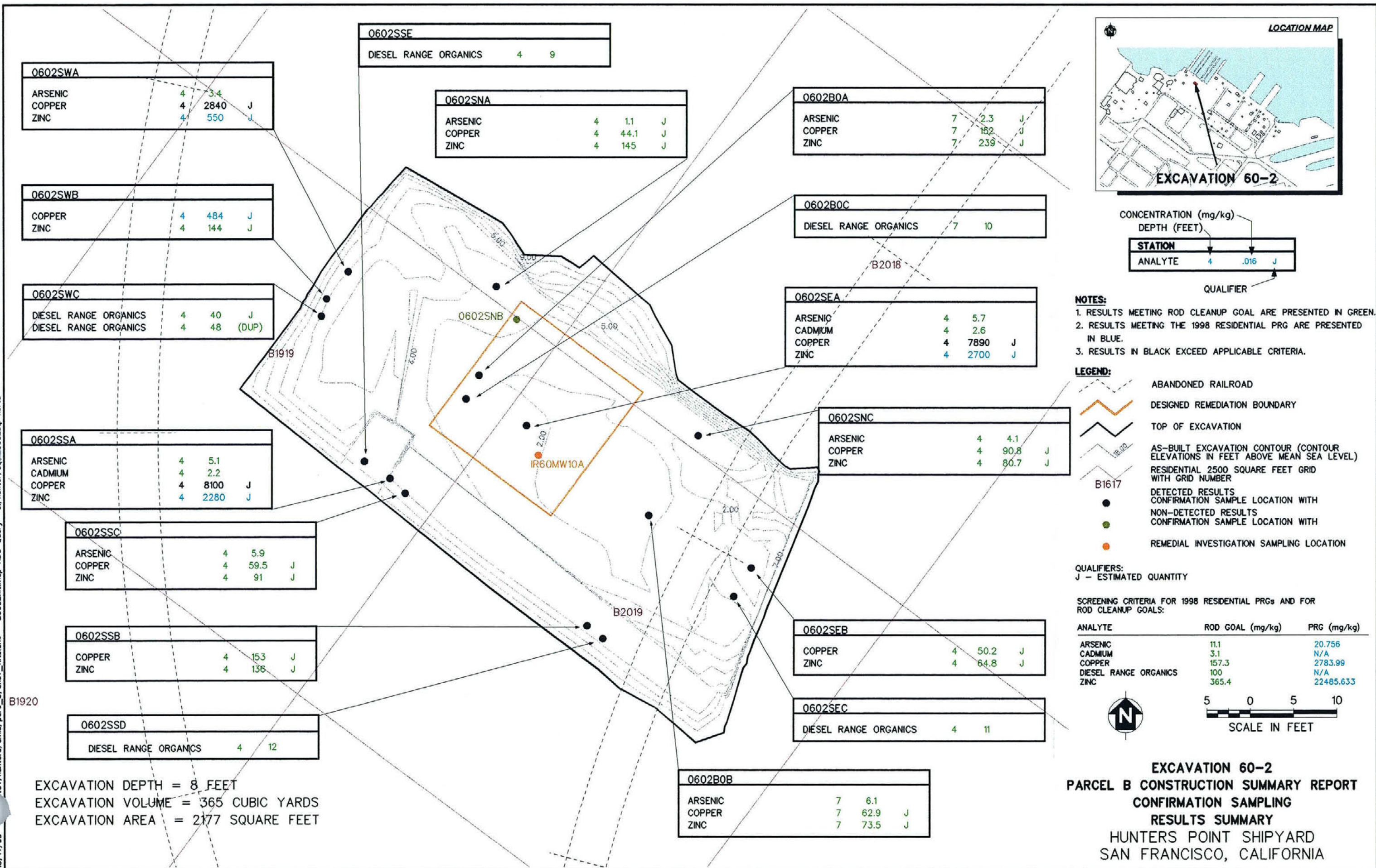
The excavation is in four residential exposure area grids. Excavation at the site removed the arsenic in sample IR60MW10A; post-remedial action concentrations of arsenic are below ambient levels. No other carcinogenic chemicals remain at the site above ambient levels. Remaining levels of copper and zinc are all less than the ROD cleanup goals, with the exception of copper in sample 0602SWB on the west wall of the excavation at 484 mg/kg, which is less than the PRG. Without the ingestion of the produce pathway, the segregated HIs for the RME case are less than 1 for all four residential exposure grids. With the ingestion of the produce pathway, the segregated HIs for the RME case are less than 1 for all of the residential exposure grids with the exception of 1919. The segregated HI of 3.0 for residential exposure grid 1919 results almost entirely from copper for the ingestion of produce pathway.

Other Information

The excavation became bifurcated by railroad tracks, which were left intact.

Conclusion:

- ✓ Risk using updated guidance meets the residential 10^{-6} cancer risk for all four residential exposure area grids.
- ✓ Hazard indices using updated guidance are below 1 for all four residential exposure area grids without the produce pathway. With the produce pathway, copper in sample 0602SWB results in a segregated hazard index of 3.0 for grid 1919.



PRELIMINARY PAH AND PCB STATISTICAL AND SPATIAL ANALYSIS PARCEL B, HUNTERS POINT SHIPYARD

The remedial investigation (RI) and feasibility study (FS) for Hunters Point Shipyard was performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Samples collected during the RI were analyzed using United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) methods. The CLP analytical techniques used to analyze confirmation samples during soil remedial action activities were refined to achieve substantially lower detection limits to meet the record of decision (ROD) cleanup goals.

The soil remedial effort at Parcel B was initiated with the theory that there were discrete areas with elevated levels of contamination caused by spills or other point source releases, and the contaminated soil would be excavated.

During the Parcel B remedial action, very low concentrations of polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs) were found in screening and confirmation samples as the contaminated areas were excavated to their design dimensions and beyond in order to meet the low cleanup goals specified in the ROD. After opening several excavations and performing numerous step-outs in an effort to achieve the ROD cleanup goals, it became apparent that:

- After the initial high PAH and PCB concentrations were removed, concentrations often did not diminish with distance from the apparent or presumed sources
- Low concentrations of PAHs and PCBs not associated with readily-identifiable sources were widespread throughout facility soils.

These findings contributed to the technical basis for the Navy's decision to pause in the remediation of Parcel B soils.

The Navy is analyzing the confirmation sample data to evaluate the remedial approach and goals. These analyses focus on interpreting the chemical concentration and spatial distribution of five PAHs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and chrysene) and the PCB Aroclor-1260 to characterize the nature of the distributions, limitations of the chemical analysis methods and data set, and the implications for additional remedial actions. The analysis is focused on PCBs and PAHs because they provide the highest contributions to risk estimations and resulted in numerous step-out excavations as discussed above.

The initial analyses of statistical and spatial aspects are being performed on the PAH data. The statistical analysis evaluated the RI data in addition to the TtEMI confirmation sample data set; the natural logarithms of same data were also evaluated. Analyses were performed for single compounds and totals of specified compounds in individual samples. Although a variety of statistical methods were evaluated for use, the preliminary findings presented below were based largely on the results of preparing cumulative probability plots and performing non-parametric two-group comparisons. The statistical calculations and presentations were performed using SAS software. The spatial analysis was performed using the same data set with an electronic base map and an ARCVIEW graphical information system (GIS).

The preliminary findings of the Navy's analysis include:

1. Differences in the detection rates of PCBs and PAHs for the RI data and the confirmation sampling is due in large part to the differences in the detection limits.
 - The frequency of detection for PCBs and PAHs was low in the RI samples. For example, 95 and 98 percent of the RI samples analyzed for the PCB Aroclor-1260 and the PAH benzo(a)pyrene were "non-detects" with detection limits greater than their ROD cleanup goal.
 - The frequency of detection for PCBs and PAHs was high in the confirmation sampling. For example, 84 and 72 percent of the confirmation samples analyzed for Aroclor-1260 and benzo(a)pyrene were detects with detection limits less than their ROD cleanup goal.
 - Concentrations detected in confirmation sampling at PAH sites were typically lower than the detection limits for the RI samples.
2. An initial statistical analysis of the PAH data set infer that:
 - The data set includes two discrete populations. The two discrete populations, characterized by higher and lower concentrations, appear to be distributed log-normally. The population with lower concentrations is larger than the population characterized by higher concentrations.
 - The RI data set includes both populations.
 - The confirmation sampling data set from the excavation surfaces generally include only concentration in the low-concentration population, because the high concentration soils have been removed.
 - The remedial actions have removed the source areas inferred by the location of concentrations in the high-concentration population
3. A preliminary spatial analysis of the PAH data set suggest that:
 - There are no patterns of high PAH concentrations suggesting point source releases.
 - The high-concentration population samples locations are spatially disparate (individual) detections, not together.
 - The low-concentration population samples appear to be more wide-spread.

The statistical and spatial analyses of the PCB data are in progress.